

Liddle teaches applying a reaction product of polysiloxanes and at least one strong acid (usually sulfuric acid and/or hydrofluoric acid) to a hard glass or plastic surface to make the same soil repellent. As set forth in column 3, lines 50 to 58, the reaction product of these components ("resulting from the chemical interaction of these materials") is complex and different than the individual components alone. The examples of the patent confirm that it is a reaction product of these components that give a desired water-repellent feature and not treatment by the acid alone or the polysiloxane alone or the sequential application. As set forth in Column 5, lines 15 to 19, the addition of each acid (i.e. hydrofluoric acid) has determinable effect on durability of repellency.

As shown by applicant's examples on pages 14 and 15 of the specification of the use of acids alone or in combination with other non-polysiloxane components on the wiper blades reduced streaking when the wiper blade wipes a vehicle windshield. While the result of applicant's invention increases visibility through the vehicle windshield, it does this by a drastically different procedure than the Liddle reference. Nowhere does applicant claim to make the wiper blade water repellant, as does the Liddle reference to the glass windshield. In fact, the acids claimed by applicant (without the polysiloxane component of the reference) should decrease the water repellency as they are water soluble, in contrast to the polysiloxane which is, at most, only water dispersible. Thus the acid in the Liddle reference and in applicant's claims functions differently to achieve a different result.

Palcher teaches using a polysiloxane emulsion to penetrate and protect a rubber, plastic or leather. He does not suggest using an acid in combination with a polysiloxane. Thus the Palcher reference lacks an acid (see Column 2, lines 36 to 42) and teaches that the polysiloxane penetrates the substrate surface. There is neither a suggestion nor a teaching in the Liddle or Palcher reference to substitute components between them as suggested by the Examiner. Liddle has a non-porous substrate (see abstract) while Palcher has a porous substrate, which can be penetrated by the polysiloxane. Therefore, the sole function of the acid in Liddle is simply to facilitate the treatment of a nonporous surface as demonstrated

by the fact that the acid is not needed to treat the porous surface of Palcher.

Finally the Bright et al. reference is combined by the Examiner with the first two references. The Bright et al. reference is limited to cleaning solutions. There is no reason to combine the components of a cleaning solution to the polysiloxane coatings of Palcher and Liddle. In fact, the cleaning solution of the Bright et al. reference would be expected to partially or fully remove the coatings of Palcher and Liddle.

In conclusion, none of the references teaches applying an acid, especially sulfonic acid, to a wiper blade. While Liddle includes sulfuric acids in his composition and Bright et al. includes amine salts of sulfonic acids, neither reference suggests acids or sulfonic acids as a treatment for wiper blades. The only nexus between Palcher and Liddle is the use of polysiloxanes and that is insufficient to suggest or teach using the rubber substrate of Palcher with the acid of the Liddle (and especially without the polysiloxane) as coating composition. An acid would not be necessary in Palcher to facilitate the absorption of the liquid by a porous material such as rubber. Further the acid of the Liddle reference only functions in combination with a polyorganosiloxane while applicant's acid functions without polysiloxanes.

Alternatively to the above argument, the §103(a) rejections are invalid because the Liddle reference is limited to rigid, nonporous substrates. The Palcher reference teaches a more porous substrate flexible substrate and teaches by the examples that only a polysiloxane is necessary (i.e. an acid is not needed to treat a porous material such as rubber under the prior art). There is no reason (contrary to the Examiner's argument) to suspect that the Liddle reference would be desirable as a coating on a rubber. The Liddle reference probably used the sulfuric and hydrofluoric acid to clean the windshield glass and possibly generate silanol groups on the polysiloxane which would then bond to the clean glass. Palcher taught that only a polysiloxane emulsion (optionally with polyol) was the necessary to prepare a rubber surface. Palcher thus teaches away from the use of the acids claimed by applicant. Polysiloxanes are known to act as agents to assist in cleaning surfaces and thus there is no motivation to add acid cleaning agents (such as the sulfuric taught in Liddle) to the Palcher composition which has

polysiloxanes. Further sulfuric acid is a strong oxidizer (see any dictionary definition) and would function to oxidize the rubber substrate of Palcher which is opposite to Palcher's motive, which is to protect the rubber from oxidation and other breakdowns.

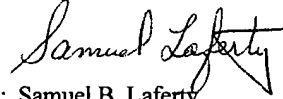
Applicant's invention is not limited to creating a soil repellent surface nor is it limited to protecting the rubber of a windshield wiper blade, nor is it limited to cleaning a wiper blade. Applicant's invention is different in that it is a single treatment to a wiper blade, so that it more effectively wipes water from a windshield or another surface and does not leave streaks of water which would undesirably affect vision through a windshield (see examples pages 14 and 15). Applicant is aware of polysiloxane compositions similar to the Liddle reference (Rain-ex), but those soil repellent coatings when applied to rubber blades (instead of the windshield) do not reduce streaking. The addition of a polysiloxane treatment of the Palcher reference to wiper blades is known not to reduce streaking. Further, it is well known to the art that a polysiloxane (e.g. Palcher's composition) applied to a rubber wiper blade actually increases streaking. This is due to the lubricity of the polysiloxane coated blade which creates the undesirable situation where the blade rises over the water rather than the desired situation where the blade slightly adheres to the glass and pushes the water in front of it. An affidavit documenting streaking of water after applying polysiloxane to a wiper blade could be provided. Thus, there is no motivation to substitute components between the Palcher and Liddle reference as both coatings are inferior to applicant's treatment.

In conclusion, there is no teaching or suggestion in the Liddle or Bright et al references to combine their components with that of the Palcher reference to form a method of treating a wiper blade. Further, there is no teaching in Palcher to combine it with the other references. Lacking motivation or teaching to combine components from the prior art the invention is patentable

In view of the above arguments, allowance of claims 13 through 20 is respectfully requested.

Respectfully submitted,

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In order to more concisely set forth applicant's arguments, and better distinguish the invention from the prior art, he sets them forth below as seven points:

I. Wiper blades are designed to operate by pushing water ahead of the moving conjunction of the blade and surface of the glass windshield.

II. To accomplish this the wiper should have a sufficiently high coefficient of friction. Otherwise, the blade will simply ride over the water, resulting in streaking.

III. While in use on a vehicle, wiper blade's surfaces are subjected to environmental contamination by insoluble grime and contaminants which cause a lowering of the blade's coefficient of friction, resulting in an increased propensity to ride over water and cause streaks which undesirably reduces visibility through the windshield.

IV. In the present application, acids, and in particular sulfonic acid, are used to both remove grime and contaminants from the wiper and the windshield, and to increase the blade's coefficient of friction on the windshield back to its desired coefficient of friction on the windshield by interacting with the blade. This increase in coefficient of friction typically continues even after the majority of the sulfonic acid has washed off, indicating a modification of the wiper by the acid, which is not taught by the prior art.

V. In Liddle, sulfonic acid was used in combination with polysiloxane for exactly the opposite purpose, that is to decrease the coefficient of friction on the glass windshield so that water would run off rather than adhere to the glass.

VI. Palcher accomplished his objectives of protecting wiper blades by decreasing the blade's coefficient of friction so that dirt and other contaminants would not adhere to the blade's surface. (Column 1, lines 27 - 30).

VII. In the present application the objectives (reducing blade streaking) are met by just the opposite means, that is increasing the blade's coefficient of friction (by applying an acid) so the blade pushes the water off the windshield rather than simply riding over the water.

There is no reasonable basis for one skilled in the art to combine the teachings of the Liddle and Palcher references in such a way as to exclude or not require the use of polysiloxane. The examiner has ignored the requirement of both references that a polysiloxane be used and has rather only required the use of one particular acid (i.e., sulfonic acid) which was not taught by the Palcher reference and was not used in any of the examples of the Liddle reference (Liddle used sulfuric and hydrofluoric acid). It is applicants' understanding that all of the desirable properties of the Palcher and Liddle references (except for long term retention of hydrophobicity) are attributed to the polysiloxane component. Only by using hindsight and recognizing that the only element required in applicant's claims is sulfonic acid, would one be motivated to combine the Palcher and Liddle references in order to use sulfonic acid by itself (a component only optionally used in the Liddle reference, and not used at all in the examples where hydrofluoric acid was used), and without the use of polysiloxane (a major functional component in Palcher and in the treatment of the Liddle reference, see column 2 of Liddle reference, lines 51 - 65 wherein only from 1 to 30 wt. % acid was used per 100 parts of polysiloxane). Further, as can be seen from the Palcher claims, 1 - 5, the composition thereof is limited to consisting essentially of emulsifiable organo polysiloxanes and water miscible polyol compounds.

In the Background of Invention of the Liddle reference, col. 1, lines 36-44, it is pointed out that the use of acids with polysiloxanes was published as early

as May, 1971 in U.S. Patent 3,579,540 for the treatment of non-porous surfaces such as glass. Therefore, the technology of using acids and polysiloxanes was readily publicly available before the time the Palcher reference was filed (between October, 1971 through January, 1974), and would have been included in the Palcher reference if the concept of using sulfonic acid alone, or in combination with polysiloxane, to treat rubber wiper blades had the same appeal to the inventor of the Palcher reference that it has to the Examiner.

In summary, a prima facie valid 103 rejection has to have some motivation for selecting particular components from the references chosen. As the Palcher and Liddle references both require polysiloxane as an essential ingredient to their treatments, there is no motivation for one skilled in the art to delete the key ingredient and, instead, select sulfonic acid (mentioned in the Liddle specification but not used in the Liddle examples) as a treatment for wiper blades.

The Bright et al. reference also has no reason to be combined with the Palcher and Liddle references, absent the teachings of applicant's specification. The title of the Bright et al. reference relates to windshield cleaner formulations which has no relationship to the Palcher reference, which is a treatment for rubber, polymers, leather, etc. The Bright et al. reference being a cleaner composition, is the anti-thesis of the Liddle reference, which is a treatment for the glass or other non-porous surface to make it dirt repellent and water repellent. The cleaning solution of the Bright et al. reference would, if it is an effective cleaning solution, probably partially or completely remove the treatment of the Liddle reference. As the Palcher reference does not mention any acids, especially sulfonic acid, there is no reason to combine the Bright et al. reference therewith, which is based on sulfonic acids.

Finally, applicant would like to review how one skilled in the art would evaluate the references applied by the Examiner. One skilled in the art would be aware of U.S. Patents such as U.S. 4,045,838 to Raymond Porter, which nicely summarizes the background of the windshield wiper treatments and the manufacture of windshield wiper blades in col. 1, line 37 through col. 2, line 51. One skilled in the art would know that the coefficient of friction of a windshield wiper blade is desirably no greater than 2.1, and preferably less than 1.5 or 1 as set forth in col. 1, lines 55-65. One skilled in the art would know that often times, new wiper blades have too high of a coefficient of friction, and this can be reduced by halogenation such as taught in U.S. Patent 3,035,297, or by treatment with an inorganic acid. These treatments are set forth in U.S. Patent 4,045,838, col. 2, lines 28-41. Although this information is most conveniently found in this particular patent 4,045,838, it is also available in the numerous other prior art references supplied to the Examiner with the Information Disclosure Statement, or during the prosecution of this application.

One skilled in the art, based upon the teachings of U.S. 4,045,838, specifically col. 2, lines 38, 39, 40 and 41 would know that inorganic acids such as nitric acid and sulfuric acid, used as treatments of wiper blades will in a relatively short time, such as 2 minutes, reduce the coefficient of friction of wiper blades. One skilled in the art knowing about the use of inorganic acid such as hydrochloric acid, sulfonic acid and hydrofluoric acid would not anticipate them as effective ways of softening or otherwise treating used windshield wiper blades (which may have hardened from use or environmental exposure), nor would one skilled in the art combine an inorganic acid, based on the Palcher and Liddle references, with polysiloxanes unless the purpose of the

treatment was to decrease the coefficient of friction of the windshield wiper blade which is contrary to the purpose of the captioned invention.

The current applicant has found that sulfonic acid softens the windshield wiper blade (this can also be expressed as increasing the coefficient of friction of the windshield wiper blade) which is contrary to the teachings of U.S. 4,045,838 with respect to sulfuric or nitric acid. Thus, applicant has an unexpected result over the most relevant prior art. The unexpected result is reported in detail in applicant's application on pages 1 and 15, wherein he shows that the sulfonic acid treatments, Example 11, and generally 16-39, dramatically reduce streaking of windshield wiper blades. Applicant's point here is that one skilled in the art would have been taught by the prior art against using sulfonic acid to soften the wiper blades to reduce windshield wiper streaking. The Liddle reference, being directed to the improvements derived from the reaction product of polysiloxanes with these inorganic acids, contravenes the merit of using sulfonic acid alone as a treatment of rubber wiper blades because as discussed above, the polysiloxane undesirably reduces rather than increases the blade's coefficient of friction.

9. RELIEF SOUGHT

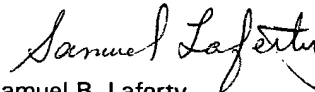
It is respectfully requested that the final rejection of claims 13, 15-18, and 20 be reversed. A Notice of Allowance is earnestly solicited.

10. FEE AUTHORIZATION

A check for \$210 is enclosed for the Appeal Brief fee of \$155.00, and the one-month extension of time fee of \$55.00 for a small entity. The Commissioner is hereby authorized to charge any additional fees to Deposit Account No. 08-3150. A duplicate of this sheet is attached.

Respectfully submitted,

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Enclosure: Copy of U.S. Patent No. 4,045,838

APPENDIX

APPEALED CLAIMS

Claims 1 - 12 are cancelled.

13. A process for treating a rubber, a thermoplastic elastomer, or a plastic wiper blade comprising;

applying a composition including one or more sulfonic acids or salt thereof to the wiping surface of said wiper blade, said sulfonic acid having from about 2 to about 36 carbon atoms.

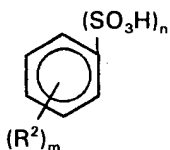
14. Cancelled

15. A process according to claim 13, wherein said sulfonic acid is an alkyl sulfonic acid of the formula



wherein R^1 contains from 2 to 36 carbon atoms, or

an aromatic sulfonic acid having the formula



or combinations thereof, or

a metal salt of said alkyl sulfonic acid or said aromatic sulfonic acid, wherein m is an integer of 1 to 4, n is an integer of from 1 to 4, with the proviso that $m + n$ is 6 or less, wherein each R^2 , independently, is an alkyl having from 1 to 30 carbon atoms and optionally contains at least one halogen, nitro, alcohol, carbonyl, or carboxyl group thereon, or combinations thereof.

16. A process according to claim 15, wherein each said R^2 group has a total of from about 9 to 13 carbon atoms.

17. A process according to claim 16, wherein said sulfonic acid is said aromatic sulfonic acid, or an alkali metal or an amine salt thereof, or combinations thereof.

18. A process according to claim 17, wherein said composition further includes one or more diluents.

(Applicant has requested the cancellation of claim 19)

19. A process according to claim 17, wherein said composition further includes one or more lubricants.

20. A process according to claim 17, wherein said composition further includes one or more water miscible solvents, or one or more acids other than said sulfonic acid, or one or more agents to adjust the viscosity of said composition, or one or more rubber protectorants to protect said rubber, said thermoplastic elastomer, or said plastic wiper blade from oxidation, or one or more neutralizers, or one or more plasticizers or softeners, or combinations thereof.

Claims 21 - 28 are cancelled.